

CLAIMS

We claim:

1. An apparatus for detecting the presence of a target, comprising:
 - (a) a probe labeled with a transition metal-ligand complex, said probe for hybridizing with said target to form an initial complex;
 - (b) a metal ion for doping the initial complex and forming a final complex; and
 - (c) potential means for providing a potential to said final complex to produce a detectable signal indicating the presence of said target.
2. An apparatus as recited in claim 1, wherein said transition metal-ligand complex is selected from the group consisting of ruthenium, osmium and their derivatives.
3. An apparatus as recited in claim 1, wherein said metal ion for doping said initial complex is selected from the group consisting of zinc, nickel and cobalt.
4. An apparatus as recited in claim 1, wherein said final complex is conductive.
5. An apparatus as recited in claim 1, wherein said target and probe have become bound through hybridization.
6. An apparatus as recited in claim 1, wherein said signal is a chemiluminescent signal.

7. A method for detecting the presence of a target, comprising:

- (a) hybridizing a probe with an attached label to said target to produce an initial complex;
- (b) adding a metal ion to the initial complex to produce a final complex; and
- (c) applying a potential to the final complex to produce a measurable signal.

8. A method for detecting the presence of a target as recited in claim 7, wherein said label attached to said hybridizing probe is a transition metal-ligand complex.

9. A method as recited in claim 8, wherein said transition metal-ligand complex has a central atom selected from the group consisting of osmium and ruthenium.

10. A method as recited in claim 7, wherein the metal added in step (b) is selected from the group consisting of zinc, cobalt and nickel.

11. A method as recited in claim 7, wherein said measurable signal is a chemiluminescent signal.

12. A method as recited in claim 7, wherein said measurable signal is an electrochemiluminescent signal.

13. A method as recited in claim 7, wherein a plurality of metal ions is added to said initial complex.

14. A method as recited in claim 7, wherein a plurality of different metal ions is added to said initial complex.

15. A method as recited in claim 7, wherein said final complex is conductive.

16. A method for detecting the presence of a target, comprising adding together a probe having an attached label, a target capable of hybridizing to the probe, and metal ions.

17. A method for detecting the presence of a target as recited in claim 16, wherein said label attached to said probe is a transition metal-ligand complex.

18. A method as recited in claim 16, wherein said transition metal-ligand complex is selected from the group consisting of osmium and ruthenium with organic coordinating ligands.

19. A method as recited in claim 16, wherein the metal ions are selected from the group consisting of zinc, cobalt and nickel.

20. A method for detecting the presence of a target, comprising:

- (a) hybridizing a probe having an attached label with said target to produce an initial complex, wherein the label produces a signal in response to application of a potential;
- (b) adding a metal ion to the initial complex to produce a final electrically conductive complex; and
- (c) applying the potential through the final complex to the label, to cause the label to produce the signal.

21. A kit for detecting the presence of a target, comprising:

- (a) a probe having an attached label that hybridizes to said target to produce an initial complex, wherein the label produces a signal in response to application of a potential;
- (b) a metal ion for adding to the initial complex to produce a final electrically conductive complex; and
- (c) potential means for applying a potential through said final complex to said label, to cause the label to produce a signal.